



# UNITED STATES DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

## **FISH AND WILDLIFE COORDINATION ACT REPORT**

McCarran Ranch Restoration Project - Truckee River  
Section 1135 Project Modifications for Improvement of the Environment  
Washoe and Storey Counties, Nevada



## **FISH AND WILDLIFE SERVICE POSITION**

This document constitutes the final report of the U.S. Fish and Wildlife Service (Service) on the Corps of Engineers' (Corps) McCarran Ranch Section 1135 Project Modification for Improvement of the Environment (Restoration Project), Washoe and Storey Counties, Nevada. This report has been prepared under the authority of the Fish and Wildlife Coordination Act, P.L. 85-624 section 2(b) and is in keeping with the spirit and intent of the National Environmental Policy Act, P.L. 91-190.

The Restoration Project is designed to restore resources that were adversely affected by the Corps' Truckee Rivers and Tributaries Project. Objectives are to restore the natural function of a two-mile reach of the Truckee River, restore a portion of the riparian habitat, and increase wildlife diversity in the project area. Aquatic ecosystem condition and function would be attained by changing the geomorphology of the Truckee River to increase the channel stability; creating and preserving riparian habitat in perpetuity to provide more suitable conditions for fish and wildlife; and increasing environmental benefits such as biological productivity and diversity. Major features include the conversion of low-valued terrestrial habitats (e.g., agriculture, invasive plants, and other degraded areas) to high-valued habitats (e.g., wetlands, aquatic, and riparian) (all alternatives). The width of the Truckee River would be reduced, several meanders would be constructed, and aquatic microhabitats (riffles, runs, and pools) added (High and Medium Plan alternatives). The High Plan has been recognized for having the greatest potential benefits to natural resources and should be considered for implementation. Various best management practices and other measures have been identified by the Corps to mitigate damages for construction activities. If enhancement measures and recommendations for avoiding and minimizing other adverse impacts to wildlife resources are followed, the Service has no objection to the project.



KENNY C. GUINN  
Governor

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RECEIVED

AUG 31 2004

Nevada Fish and Wildlife Office

August 25, 2004

*David DP*

Mr. David Potter  
Wildlife Biologist  
U.S. Fish and Wildlife Service  
1340 Financial Blvd. Suite 234  
Reno, Nevada 89502

Re: McCarran Ranch-Truckee River Section 1135

Dear Mr. Potter:

The Nevada Department of Wildlife appreciates your effort to coordinate the planning and implementation of the habitat restoration of the McCarran Ranch in Washoe County.

We strongly support the contents of this plan and proposed projects for the Truckee River. It is our understanding that the wild horses within the project are not associated with a Bureau of Land Management wild horse management area. These horses are considered estray and are subject to removal by request of the landowner to the Bureau of Land Management. This may ease the obligation to prepare a management plan or deal with management issues under the Act.

If there are any questions or need for specific input, please contact Ms. Kim Tisdale, Fishery Biologist, 688-1882.

Sincerely,

*Roy Leach*  
Roy Leach  
Western Region

cc. Habitat, Reno  
Kim Tisdale

# **Coordination Act Report**

## **McCarran Ranch, Truckee River Section 1135 Project Modifications for Improvement of the Environment**

Washoe and Storey Counties, Nevada

Prepared for the  
Sacramento District  
U.S. Army Corps of Engineers

by

U.S. Fish and Wildlife Service  
Nevada State Office  
Reno, Nevada

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2005-04-07

## PREFACE

This is a final coordination act report (CAR) prepared by the Fish and Wildlife Service (Service) as requested in the U.S. Army Corps of Engineers' (Corps) May 27, 2003, Scope of Work for the McCarran Ranch-Truckee River Section 1135 Aquatic Ecosystem Restoration Project, Nevada (Restoration Project). It is a detailed report of the impacts on fish and wildlife associated with the restoration of the McCarran Ranch along approximately two miles of the Truckee River. It has been prepared under the authority, and in accordance with the provisions, of the Fish and Wildlife Coordination Act, P. L. 85-624 Section 2(b) and is in keeping with the spirit and intent of the National Environmental Policy Act (NEPA).

The Restoration Project is being prepared by the Corps in response to a request by the Nature Conservancy (TNC). TNC recently acquired the 304-acre McCarran Ranch located along the Truckee River, near Patrick, Nevada in 2002. TNC has requested that the Corps evaluate the current restoration plan for McCarran Ranch, which is being implemented under the authority of Section 1135(b) of the Water Resources Development Act of 1986 (33 U.S.C. 2294), as amended. Section 1135 projects may be undertaken if it is demonstrated that the construction or operation of an existing Corps project has contributed to the degradation of the quality of the environment. The Restoration Project is designed to restore resources that were adversely affected by the Corps' Truckee Rivers and Tributaries Project. Objectives of the Restoration Project are to restore the natural function of a two-mile reach of the Truckee River, restore a portion of the riparian habitat, and increase wildlife diversity in the project area (US Army Corps of Engineers 2004). A one-mile reach of the Truckee River immediately upstream of the proposed action has been restored under a pilot project conducted by TNC. The pilot project is not included as part of this Restoration Project which is partially funded by the Corps.

The purpose of the CAR is to provide information to the Corps' Sacramento District Office on important fish and wildlife resources within the project area. This CAR addresses fish and wildlife issues and concerns that may arise during the planning process for rehabilitation of the river channel. The goals of the Service in its study are to: (1) evaluate the impact of the proposed project on fish and wildlife populations and their habitats, and their utilization by the public throughout the planning area; (2) recommend methods of mitigating unavoidable fish and wildlife habitat losses; and (3) recommend methods of enhancing fish and wildlife habitats where feasible.

Findings presented in this CAR are based on a field visit conducted on September 15, 2003 (attended by Corps and Service employees), communication with Nevada Department of Wildlife (NDOW) personnel familiar with the area, various documents, National Wetland Inventory maps, and the project description presented in the following documents provided by the Corps:

- Plan for the Ecological Restoration of the McCarran Ranch Reach of the Truckee River March, 2003;

- McCarran Ranch-Truckee River Section 1135 Aquatic Ecosystem Restoration Project Washoe and Storey Counties, Nevada, Administrative Draft Environmental Assessment (EA), February 2004; and
- Draft McCarran Ranch Ecosystem Restoration Habitat Evaluation Procedure and Aquatic Habitat Evaluation, December, 2003.

During the Service's review of the draft Administrative EA, some discrepancies were observed with regards to quantities of affected habitat types or acreages and it was not clear if TNC's pilot project was discounted from these estimates. Discussions with the Corps suggest these discrepancies would be addressed by their staff as time and funding allowed, but after the final CAR was issued. For these reasons, some data inconsistencies may be evident between the CAR and the final EA (and other Corps' documents).

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## DESCRIPTION OF THE PLANNING AREA

In 2002, the Nature Conservancy (TNC) acquired the 304 acre McCarran Ranch, located in rural portions of Washoe and Storey counties with plans to restore the project area (U.S. Army Corps of Engineers 2004). The planning area for the McCarran Ranch Restoration Project (Restoration Project) occurs in and adjacent to two miles of the Truckee River located in portions of T. 19 N., R. 21 E., sections 1 and 2; T. 19 N., R. 22 E., section 6; and T. 20 N., R. 22 E., section 31 (Figure 1). This is located near Patrick, Nevada, approximately 19 miles downstream of Reno, NV. TNC has requested that the Corps evaluate the current restoration plan for McCarran Ranch, which is being implemented under the authority of Section 1135(b) of the Water Resources Development Act of 1986 (33 U.S.C. 2294), as amended. Section 1135 projects may be undertaken if it is demonstrated that the construction or operation of an existing Corps project has contributed to the degradation of the quality of the environment. The Restoration Project is designed to restore resources that were adversely affected by the Corps' Truckee Rivers and Tributaries Project. The Corps has recently completed a draft Environmental Assessment (U.S. Army Corps of Engineers 2004) which is largely the information source used in developing this Coordination Act Report (CAR).

The Truckee River begins in the California Sierra Nevada Mountains and flows into the southern end of Lake Tahoe. The Truckee River continues to flow from the northern end of Lake Tahoe at Tahoe City and travels for about 105 miles through canyons, valleys, and towns, and terminates at Pyramid Lake, a closed basin in Nevada. The planning area lies within the Truckee River basin, which encompasses 3,060 square miles of California and Nevada (U.S. Department of Interior 1998). The basin is characterized by cycles of flood and drought. Average annual discharge in the Truckee River at Vista from 1899 to 1996 was 584,000 acre-feet (U.S. Geological Survey, 1996).

The Truckee River, in recent history, occupied a narrow and deep meandering channel with large cottonwood trees along its banks. Today the river is straighter, wider, and shallower with little or no forest vegetation along large segments. The lower reaches have become braided. Precipitation, in the form of snowmelt in the Sierra Nevada, is the primary source of water in the drainage basin. Peak discharge typically coincides with snowmelt in the spring, and the minimum discharge typically occurs in late summer.

The 160 acre area for the Restoration Project has also experienced degradation of important riparian and aquatic habitats as a result of road and railroad construction, Corps' river modifications, farming, and cattle grazing. These changes, in turn, have diminished natural ecosystem structure, function, and processes of the Truckee River and associated riparian habitat and caused a decrease in fish and wildlife diversity. The existing river channel is incised, shallow, and not well connected to its floodplain. Hydraulic habitat complexity and diversity is limited, consisting of 13 riffles, seven pools, and 12 runs.

### **Vegetation**

Recent surveys in the Restoration Project area resulted in identification of four dominant vegetation communities and two ground cover types as shown in Table 1 (Otis Bay 2003). Comparison with past conditions show that the quality of the native riparian and shrub plant communities is declining due to

invasive plants such as tall whitetop (*Lepidium latifolium*) and sweet clover (*Melilotus officinalis*), which dominate riparian native plants. The survey also noted a number of disturbed areas among shrub plant communities that have resulted in bare ground. The notable loss of wetlands and cottonwood forest from historical conditions is especially apparent.

## Wildlife

Wildlife habitat within the Restoration Project area has been degraded from past farming practices, livestock grazing, introduced exotic species, construction and operations of I-80 and the railroad, and Corps' flood control projects on the Truckee River. These impacts have especially affected bird species.

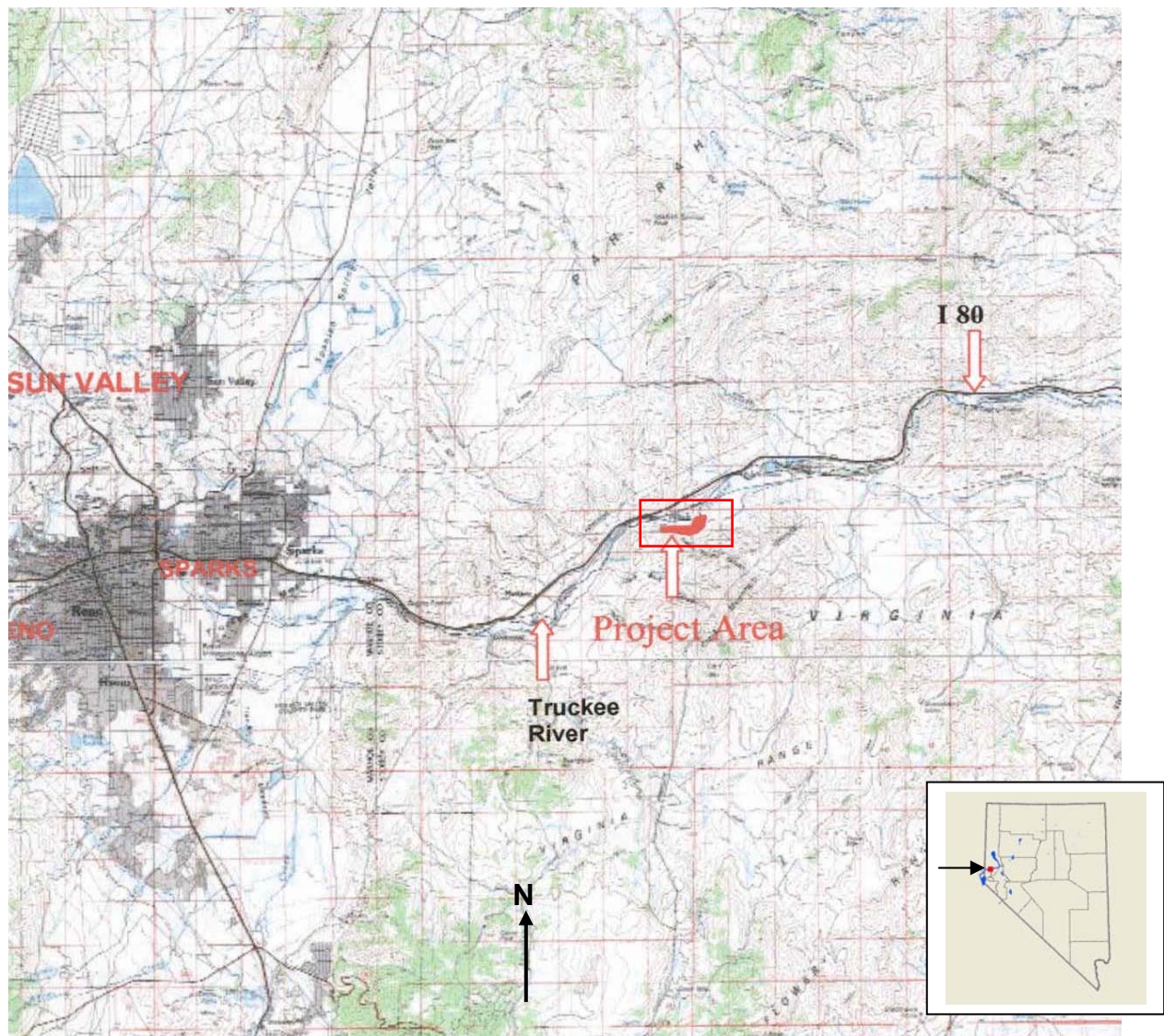


Figure 1. Location of the McCarran Ranch Restoration Project on the lower Truckee River, Nevada.

Table 1. Existing habitat types within the McCarran Ranch Restoration Project area.

Vegetation Community	Dominant Species/Description	Acres
COTTONWOODS: Palustrine Forested/scrub/shrub temporarily flooded (PFO/SSA)	Cottonwoods and red willows with a fully developed canopy < 1 tree height apart with understory dominated by whitetop, big sagebrush ( <i>Artemisia tridentata</i> ), Wyoming sagebrush ( <i>Atriplex confertifolia</i> ), greasewood ( <i>Sarcobatus vermiculatus</i> ), fourwing saltbrush ( <i>A. canescens</i> ), big saltbrush ( <i>A. lentiformis</i> ), rabbitbrush ( <i>Chrysothamnus spp.</i> ), and other grasses and forbs	12.00
UPLAND: Big sagebrush shrublands/Wyoming sagebrush shrublands (BSS/WSS)	Big and Wyoming sagebrush, other shrub species, greasewood, rubber rabbitbrush ( <i>C. nauseosus</i> ), and fourwing saltbrush	16.60
WETLANDS: Palustrine Emergent Saturated and Seasonally Flooded (PEMB and PEMC)	Desert saltgrass ( <i>Distichlis stricta</i> ), Douglas sedge ( <i>Carex douglasii</i> ), creeping wildrye ( <i>Leymus triticoides</i> ), and upland forbs	7.40
Agricultural land (AG)	Unused agricultural field and pasture lands	21.00
AQUATIC: River	Truckee River	58.65
FALLOW: Invasive Plants	Whitetop and sweet clover	13.00
UNSPECIFIED <sup>a</sup>	Disturbed upland	29.81
	<b>Total:</b>	<b>158.46</b>

<sup>a</sup> This category was added to account for discrepancies in acreage calculation from the draft EA.

For example, in the 1970s only 65 species were recorded compared to 107 species detected in 1868 (Ammon 2002). Birds that experienced the greatest losses were those with life histories associated with riverine and wetlands habitats such as American widgeon (*Anas Americana*), Long-billed curlew (*Numenius americanus*), American bittern (*Botaurus lentiginosus*), and common yellowthroat (*Geothlypis trichas*). The most recent survey results indicate that species associated with early successional riparian woodlands may be recovering in response to instream flow restoration (Ammon 2002). However, populations of shorebirds and wetland birds are expected to remain low until restoration of wetland complexes can occur.

Reductions to the diversity and abundance of amphibian and mammal populations along the Truckee River have also likely occurred. Other wildlife species found include wild horses, deer, rabbits, and other small mammals common to western Nevada. A comprehensive list of wildlife species found in the Restoration Project area is listed in Appendix A.

## Fish

The Truckee River supports a wide variety of native and nonnative species. The federally endangered cui-ui (*Chasmistes cujus*) resides in Pyramid Lake and uses the lower portion of the Truckee River as spawning habitat. The Lahontan cutthroat trout (LCT; *Oncorhynchus clarki henshawi*), federally listed as threatened, is also found in Pyramid Lake but may seasonally use the Truckee River as a migration corridor. Rearing and spawning stream habitats for LCT are primarily restricted to higher elevation tributaries in California. Other native species in the lower Truckee River include: mountain whitefish

(*Prosopium williamsoni*), Lahontan redbreasted shiner (*Richardsonius egregius*), speckled dace (*Rhinichthys osculus*), Tahoe sucker (*Catostomus tahoensis*), and mountain sucker (*C. platyrhynchus*). Nonnative species include rainbow trout (*O. mykiss*), brown trout (*Salmo trutta*), goldfish (*Carassius auratus*), carp (*Cyprinus carpio*), golden shiner (*Notemigonus crysoleucas*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), green sunfish (*Lepomis cyanellus*), black crappie (*Pomoxis annularis*), fathead minnow (*Pimephales promelas*), mosquitofish (*Gambusia affinis*), channel catfish (*Ictalurus punctatus*), and brown bullhead (*I. nebulosus*).

## DESCRIPTION OF THE PROJECT

The proposed Restoration Project will help restore the natural functions of the Truckee River as well as riparian, wetland, and upland habitats in the McCarran Ranch vicinity. Depending on the alternative selected, the Restoration Project would incur numerous benefits to habitat for flora and fauna, including:

- Creating additional river meanders and riffle-pool-run complexes to increase aquatic habitat diversity for benthic macroinvertebrates and fish;
- Raising streambed elevation to reconnect the Truckee River to its flood plain in support of wetlands, increased flood capacity, and enhanced water quality;
- Increasing shaded riverine areas to reduce water temperatures and provide in-stream cover;
- Increasing riparian vegetation to reduce streambank erosion;
- Converting noxious weed and agricultural areas into highly-valued wildlife habitats;
- Creating new wetland areas for waterfowl and amphibians; and
- Creating specific habitat features such as caves, hillocks, and dens.

The four plan alternatives (No Action, Low, Medium, and High) are considered for the potential project as described below and summarized in Tables 2 and 3. All three action alternatives would involve revegetation of agricultural and noxious weed areas using native plants. Disturbed areas (e.g., agriculture) of low value to wildlife would be converted into natural habitats (e.g., riparian, riverine, and wetlands). All action alternatives would also address potential contamination of noxious weeds through a plan to be developed by TNC. Existing vegetation around emergent wetlands would be retained as much as possible.

Construction for action alternatives would require the use of heavy equipment such as excavators, bobcats, backhoes, haul trucks, water trucks, and service trucks. Construction periods would vary from three months to two years. Work adjacent to the river would occur during low flow periods. Existing access roads would be used where appropriate. New access roads and staging sites would be placed in disturbed areas and restored after project completion. Use of staging areas and access roads would not experience significant adverse effects on local environmental resources. A comprehensive list of common avoidance measures identified by the Corps to reduce adverse impacts is provided in Appendix B.

Restoration areas would be irrigated and monitored for a period of three years. Fencing would be installed to protect vegetation from grazers. Monitoring requirements would decrease as vegetation

Table 2. Summary of proposed actions and comparison of aquatic conditions among alternatives for the McCarran Ranch Restoration Project.

	No Action	Low Plan	Medium Plan	High Plan
<b>NARRATIVE:</b>	Status quo	Slope riverbanks & bioengineering to stabilize banks, addition of shaded riparian areas	Realign & narrow the river, add meanders, raise streambed & groundwater elevation, create additional riffle-pool complexes, & add shaded riparian areas	Realign & narrowing the river, add meanders, raise streambed & groundwater elevation, create additional riffle-pool complexes, & add shaded riparian areas
<b>STRUCTURE:</b>				
Affected reach (ft)	0	0	500	700
Affected area (acres):	0	0	3.0	4.3
$\Delta$ riverbed elevation (ft)	0	0	+ 1 to 2	+ 1 to 2
Average river width (ft)	150	150	80	80
Sinuosity	1.25	1.25	1.31	1.33
No. of meanders	6	6	8	9
Shaded riparian (acres)	12.00	20.22	29.89	32.53
<b>MICROHABITATS:</b>				
Riffles				
Number:	13	13	20	19
Area (acres):	32.39	32.39	17.65	19.76
Pools				
Number:	7	7	17	19
Area (acres):	9.24	9.24	15.79	16.73
Runs				
Number	12	12	16	17
Area (acres):	17.03	17.03	20.08	17.30

Table 3. Comparison of terrestrial conditions among alternatives for the McCarran Ranch Restoration Project. Numbers are in acres unless otherwise indicated.

	No Action	Low Plan	Medium Plan	High Plan
<b>WETLANDS:</b>			8 wetlands added	16 wetlands added
Palustrine emergent saturated (PEMB)	7.40	9.64	10.45	8.41
Palustrine emergent seasonally-flooded (PEMC)	0.00	1.80	3.31	7.80
Total:	7.40	11.44	13.76	16.21
<b>WILLOW:</b>				
Palustrine scrub-shrub/emergent seasonally (PSS/EMC) & semi-permanently flooded (PSS/EMF)	0.00	5.32	5.91	13.71
Palustrine scrub-shrub temporarily flooded (PSSA)	0.00	1.00	7.14	9.33
Riverine lower perennial unconsolidated bottom seasonally flooded (R2USC)	0.00	5.98	5.54	7.11
Total:	0.00	12.30	18.59	30.15
<b>COTTONWOOD:</b>				
Palustrine forested/scrub-shrub temporarily flooded (PFO/SSA)	12.00	26.24	36.35	37.42
<b>UPLAND:</b>				
Big sagebrush shrublands /Wyoming sagebrush shrublands (BSS/WSS)	16.60	32.75	27.24	20.89
<b>AGRICULTURAL:</b>	21.00	0.00	0.00	0.00
<b>AQUATIC (River):</b>	58.65	58.65	53.53	53.79
<b>INVASIVE PLANTS:</b>	13.00	0.00	0.00	0.00
<b>UNSPECIFIED:</b>	29.81	17.08	8.99	0.00

becomes more established and would cease when plants are self-sufficient. After the monitoring period, TNC would assume operation and management of the land.

### **No Action Alternative**

Under this alternative, no action would be taken to restore the Truckee River or adjacent riparian and upland areas at McCarran Ranch. Future conditions would include continued stream instability and loss of in stream habitat, loss of riparian and upland habitats and associated wildlife values, and reduced water quality in this area. Any habitat-based projects being developed by other Federal, State, and local agencies would continue within the Truckee River watershed.

### **Low Level Restoration Plan Alternative**

This alternative (Low Plan) proposes a low-level approach that would assist in restoring the natural functions of the aquatic and terrestrial habitats, resulting in benefits to fish and wildlife (including special status species). The Low Plan would stabilize eroding banks of the Truckee River by sloping banks, protecting toes, and implementing bio-engineering techniques. River dynamics would be initiated so the river can passively achieve channel pattern, sinuosity, and a connected flood plain. The channel would remain entrenched for the near term, but the existing barriers (jetties, riprap) to channel migration would be removed.

This alternative would create 14.24 acres of cottonwood habitat and 12.3 acres of willows along the channel. About 4.04 acres of wetlands and 16.15 acres of sagebrush/upland habitats would also be created. Twenty-one acres of agricultural lands, 13.00 acres of invasive weed, and 12.73 acres of other disturbed areas would be converted to other habitat types. At project completion, there would be 26.24 acres of cottonwood, 12.30 acres of willow, 11.44 acres of wetlands, 32.75 acres of sagebrush/upland, and 58.65 acres of riverine habitats. A portion of the other disturbed areas (17.08 acres) and none of the agriculture and invasive plant habitats would remain. (U.S. Army Corps of Engineers 2004; Stewart 2005).

Construction of the revegetation plan would take about three months to complete. Bioengineering measures could include coir mattresses using grass and sedges to stabilize eroding areas, willow wattles or fascines, and boulders in the river where bank shearing is occurring. Active channel realignment, narrowing of the river width, or channel elevation would not occur. No riffle- pool-run complexes would be constructed in the river. As a result, there would be no immediate increase in sinuosity or channel length. Approximately 32.22 acres of banks would be sloped and vegetated to provide stability.

The Low Plan would accomplish a number of things, including addition of shaded riparian areas which would lower water temperatures and provide a source of allochthonous material to the river. In-stream fish habitat would be enhanced. The enhanced riparian forest and upland shrub habitat would provide additional nesting, foraging, rearing, and resting habitat for terrestrial wildlife.

### **Medium Level Restoration Plan Alternative**

This alternative (Medium Plan) proposes to implement in-stream modifications of the Truckee River. The Medium Plan would narrow the river's average channel width to 80 feet and realign 500 feet (3.0 acres) of the river by creating two meanders, thus increasing sinuosity. Each meander would be



constructed to the required depth and width to raise the streambed elevation by one to two feet. Existing rock bars would be elevated to help raise water levels. These features, in turn, would help reconnect the river to its flood plain, support riparian plantings, and improve water quality and fish habitat. Additionally, the new alignment will involve creation of seven riffles, ten pools and four runs, thus increasing in-stream habitat diversity. Acreage of pool and run habitat constructed would be increased by 6.56 and 3.05 acres, respectively. Riffle habitat, however, would incur a loss of 14.73 acres. The narrowing of the river would reduce the total river acreage within the Restoration Project area to 53.53 (Stewart 2005).

This alternative would also create 24.35 acres of cottonwood, 18.59 acres of willows, 6.36 acres of wetlands and 10.64 acres of sagebrush/upland habitat. Twenty-one acres of agricultural lands, 13.00 acres of invasive weeds, and 20.82 acres of other disturbed areas would be converted to the other habitat types. At project completion, there would be 36.35 acres of cottonwood, 18.59 acres of willow, 13.76 acres of wetlands, and 27.24 acres of sagebrush/upland habitat. A portion of the other disturbed areas (8.99 acres) and none of the agriculture and invasive plant habitats would remain. Additional acres of wetland habitat will be created by excavating eight natural depressions in the Truckee River's floodplain. Also, small habitat features for wildlife would be constructed such as caves, hillocks, and dens, the designs of which would be developed later and depend on available material.

Construction of the new river alignment and revegetation would take a total of five months to complete over two phases covering two construction years. The portions of the Truckee River not a part of the new alignment would be filled with soil excavated during meander construction. Excavated soil and imported rock would be used to narrow the river's width. The height of the rock bars would be raised to increase the river's water level and subsequently, the groundwater table.

The Medium Plan would accomplish the same things as the Low Plan and more. Pool-riffle-run complexes would create habitat for macroinvertebrates which would provide a food source for fish.

### **High Level Restoration Plan Alternative**

This alternative (High Plan), like the Medium Plan, proposed to restore natural function of the aquatic and terrestrial habitat, but through a high-level approach. About 700 feet (4.3 ac) of the Truckee River would be reconfigured to create three new meanders, increasing the sinuosity of the river. Meanders would be designed to raise the streambed elevation by one to two feet, thus promoting connection between the river and the floodplain. Construction would add six riffles, twelve pools and five runs, but decrease the average length of these structures. Acreage of pool and run habitats would increase by 7.49 acres and 0.27 acres, respectively, however, for riffle habitat, the High Plan would result in a loss of 12.62 acres. The narrowing of the river would reduce the total acreage within the Restoration Project area to 53.79 (Stewart 2005)

This alternative would create 25.42 acres of cottonwood, 30.15 acres of willows, 8.81 acres of wetlands and 4.29 acres of sagebrush/upland habitat. Twenty-one acres of agricultural lands, 13.00 acres of invasive weeds, and 29.81 acres of other disturbed areas would be converted to other habitat types. At project completion, this alternative would result in a total of 37.42 acres of cottonwood, 30.15 acres of willow, 16.21 acres of wetlands, and 20.89 acres of sagebrush/upland habitat. None of the other disturbed areas, agriculture, and invasive plant habitats would remain. (U.S. Army Corps of



Engineers 2004). Additional acres of wetland habitat will be created by excavating 16 natural depressions in the Truckee River's floodplain. Like the Medium Plan, small habitat features for wildlife would be constructed such as caves, hillocks, and dens, the designs of which would be developed later and depend on available material.

Construction and revegetation under the High Plan is anticipated to last seven months and occur in two phases over two years. Each meander would be constructed to the necessary depth and width to support riparian plantings and increase the groundwater table elevation by one to two feet. Appropriately sized cobble rock would be placed on the lower banks and bed of each meander to provide temporary bank stability. Cobble rock fill similar to that currently in the river would be placed in the channel to create riffles. River portions no longer needed would be filled with excavated soil. Riparian vegetation would be planted along the realignment.

The High Plan would have similar accomplishments as the Medium Plan, but over a larger area.

## **BIOLOGICAL AND SOCIO-ECONOMIC EVALUATIONS**

### **Future Without the Project**

Under this alternative, the Corps would not participate in the ecosystem restoration at McCarran Ranch. No in-stream and wetland construction, active plantings, or noxious weed containment activities would occur to restore the Truckee River or adjacent riparian and upland areas. Future conditions without the Restoration Project include:

- riverbed and groundwater elevations would not rise above present levels and contribute to the disconnection between river and floodplain;
- river would continue to widen and shallow thus leading to thermal loading;
- continued river instability leading to streambank erosion and incision;
- limited shaded riparian areas and in-stream cover;
- diminished in-stream microhabitat diversity and velocity regimes;
- continued spread of invasive weeds; and
- agricultural, invasive weed, and other disturbed areas would not be converted to habitats of higher value to wildlife.

These factors would contribute to continued stream instability, loss of riparian and upland habitats and associated wildlife values, and reduced in-stream aquatic habitat and water quality in this area and areas downstream. The expected response of flora and fauna are described below.

### Vegetation Resources

Cottonwood and willow stands with understory shrubs in the Restoration Project area would continue to diminish due to the lower water table and infrequent flood flows important for recruitment and maintenance. Although agricultural lands would remain fallow, these areas and others, would likely become infested with invasive plants such as tall whitetop and sweet clover in the absence of the revegetation plan. Diversity in plant communities would remain low.

## Wildlife Resources

The loss of wetlands and cottonwood forest would continue to reduce the diversity and numbers of associated wildlife species. Populations and diversity of birds and mammal species dependent on riparian habitats will continue to decrease, while those dependent on disturbed areas (e.g., dominated by invasive plants) will increase. Amphibians dependant on wetlands such as turtles and frogs would also continue to decline.

## Aquatic Resources

Benthic macroinvertebrate (BMIs) and fish communities in the middle portion of the Truckee River near the project area would continue to be dominated by taxa that are tolerant to moderate or highly degraded water quality and habitat conditions. Continual degradation in aquatic habitat would be reflected in higher water temperatures, degraded water quality, lack of cover, limited depth/velocity diversity, minimal allochthonous input, substrate embeddedness, sediment-dominated substrates (i.e., fines), and limited microhabitats diversity (e.g., pool-riffle complexes). This would result in a domination by highly tolerant BMI taxa such as chironomids (midgeflies), oligochaetes (worms), and hirudineas (leeches). Resident native coolwater fishes would be completely displaced by warmwater exotic fish taxa such as brown trout, centrarchids (sunfishes, bass), bullhead, and carp. Furthermore, such conditions would inhibit use of this reach as a seasonal migration corridor for salmonids.

## Socio-Economic Evaluation

The McCarran Ranch was established around 1875, and was privately owned and maintained as a working ranch/agricultural enterprise until 1975. In 1975, management was given to the Pioneer Citizen Bank, and the agricultural lands were leased for grazing and farming. Additional lands were leased for sand and gravel production. In 2002, the property was purchased by TNC to be used as open space (U.S. Army Corps of Engineers 2004).

According to a Nevada Department of Wildlife's Truckee River Annual Project Report (1999), within the Derby Dam to East McCarran Bridge section of the Truckee River, 125 anglers fished 174.2 hours, catching 122 fish. This is a catch rate of 0.70 fish per hour. Sixty-three percent of the fish were rainbow trout, 20 percent were cutthroat trout, three percent were brown trout, seven percent were carp, and seven percent were suckers. Fifty-seven percent of the anglers were from Reno and 24 percent were from Sparks, Nevada. This kind of recreational use would likely be reduced as the quality of fishing degrades.

## **Future With the Project**

This section discusses the potential project impacts on aquatic and terrestrial resources for the current alternatives, with an emphasis on habitat value as determined by set criteria.

All active alternatives would incur temporary adverse effects on existing vegetation and wildlife in the Restoration Project Area due to disturbances associated with construction. The use of heavy equipment will incur noise, soil compaction, plant, potential for contaminant leaks (e.g., diesel fuel). The total length of time for construction varies from three to seven months and may incur several phases lasting up to two years. Any temporary adverse effects would not be

expected to last beyond three years after the onset of construction because of the implementation of avoidance measures (Appendix B).

#### Resource Category Determination

Under the Service's Mitigation Policy (Fed. Reg. 46:15, January 23, 1981), resources are assigned to one of four categories based on their value to fish and wildlife. The criteria on which these categories are based, and their associated mitigation planning goals, are provided in Table 4. Note the major distinctions between Categories 2 and 3 relate to the value of the resource to the evaluation species, and the relative abundance of the resource on a national or ecoregion basis. In addition to this Mitigation Policy, Region One of the Service has a Wetland Policy, which makes it the goal of the Region to insure that no net loss (acreage or value, whichever is greater) of wetland habitats occurs. Neither the Service Mitigation Policy, nor the Regional Wetland Policy apply to federally-listed endangered or threatened species.

Table 4. Resource Category criteria and associated mitigation goals under the Service Mitigation Policy.

Resource Category	Criteria	Mitigation Goal
1	High value to evaluation species, unique on a national or ecoregion basis	No loss of existing habitat value
2	High value to evaluation species, relatively scarce or becoming scarce on a national or ecoregion basis	No net loss of in-kind habitat value
3	High to medium value to evaluation species, and relatively abundant on a national basis	No net loss of habitat value
4	Medium to low habitat value	Minimize loss of value

Evaluation species are those species, species life stages, populations, and communities considered from ecological, social, institutional, and/or other considerations to be important and thus considered in resource category determinations. The maintenance of biological diversity is considered an integral part of any determination. For purposes of designating resource categories, evaluation species were the same as that used for the Habitat Evaluation Procedure (HEP) analysis: hairy woodpecker (*Picoides villosus*), spotted towhee (*Pipilo maculatus*), marsh wren (*Cistothorus palustris*), and American kestrel (*Falco sparverius*).

Based on this approach, vegetation types associated with wetlands, rivers, and riparian areas were designated as Resource Category 2. Upland habitats, being relatively abundant in the area, were designated as Resource Category 3. Agricultural, invasive plant vegetation types, and other disturbed areas were designated as Resource Category 4.

All action alternatives will involve converting habitat types of low resource value to that of higher resource value (Tables 5 and 6).

Table 5. Conversion of habitat types in relation to resource categories under the No Action, Low (L), Medium (M), and High (H) plan alternatives.

		Wetlands		Willows			Cotton-wood	Aquatic	Upland	Agri-culture	Fallow	Un-specified	No Action
To: From:	Resource Category <sup>a</sup>	PEMB	PEMC	PSS / EMC & EMC	PSSA	R2USC	PFO / SSA	River	BSS / WSS	Ag	Inv Plants	Other <sup>b</sup>	Total (ac):
Resource Category		2	2	2	2	2	2	2	3	4	4	4	
PEMB	2	-	-	-	-	-	-	-	-	-	-	-	7.40
PEMC	2	-	-	-	-	-	-	-	-	-	-	-	0.00
PSS/EMC & PSS/EMF	2	-	-	-	-	-	-	-	-	-	-	-	0.00
PSSA	2	-	-	-	-	-	-	-	-	-	-	-	0.00
R2USC	2	-	-	-	-	-	-	-	-	-	-	-	0.00
PFO/SSA	2	-	-	-	-	-	-	-	-	-	-	-	12.00
River	2	-	-	H	H	-	M, H	-	-	-	-	-	58.65
BSS/WSS	3	M, H	M, H	M, H	M, H	-	M, H	-	-	-	-	-	16.60
Ag	4	H	H	H	H	M, H	L, M, H	M, H	L, M, H	-	-	-	21.00
Inv Plants	4	L, M, H	L, M, H	L, M, H	L, M, H	L, M, H	L, M, H	M, H	L, M, H	-	-	-	13.00
Other <sup>b</sup>	4	L, M, H	L, M, H	L, M, H	L, M, H	L, M, H	L, M, H	M, H	L, M, H	-	-	-	29.81
												Total:	158.46
Totals By Alternative (acres)													
<b>Low</b>		9.64	1.80	5.32	1.00	5.98	26.24	58.65	32.75	0.00	0.00	17.08	
<b>Medium</b>		10.45	3.31	5.91	7.14	5.54	36.35	53.53	27.24	0.00	0.00	8.99	
<b>High</b>		8.41	7.80	13.71	9.33	7.11	37.42	53.79	20.89	0.00	0.00	0.00	

<sup>a</sup> Darker shaded areas indicate higher value habitat types.

<sup>b</sup> Other refers to other degraded habitat types, not specifically identified by the Corps at the time of the writing of this CAR, which will be converted to habitat types of a higher resource category.

Table 6. Total acreages by resource category under the No-Action, Low, Medium, and High plan alternatives.

Resource Category: Alternative:	2	3	4
<b>No Action</b>	78.05	16.60	63.81
<b>Low</b>	108.63	32.75	17.08
<b>Medium</b>	122.23	27.24	8.99
<b>High</b>	137.57	20.89	0.00

### No Action

The No Action Alternative would not impact any aquatic or terrestrial resources in the project area. The area of habitat in Resource Categories 2 and 3 would likely remain the same (78.05 and 16.60 acres, respectively). However, vegetation types designated as Resource Category 4 would likely expand in the case of noxious weeds. Future conditions would include continued stream instability, water quality degradation, loss of riparian vegetation, and reduced instream habitat. Vegetation and wildlife resources would decline.

### Low Level Restoration Plan

The Low Plan would create or enhance the aquatic habitat along the Truckee River by providing shaded riparian areas, and sloping banks of the stream. The Truckee River would be allowed to migrate by managing the erosion sites so the river would reach equilibrium and create meanders naturally. These would, in turn, reduce water temperatures and improve general conditions for in-stream fish habitat. Riparian forest and upland shrub habitat would also be enhanced to provide additional resting, foraging, nesting, and rearing areas for terrestrial wildlife. Habitat areas of moderate and low resource value would be converted into that of high value terrestrial vegetation types, resulting in a total of 108.63 acres of Resource Category 2 and 32.75 acres for Resource Category 3.

A Habitat Evaluation Procedure (HEP) was performed for this project in the fall of 2003. This alternative would increase the cottonwood habitat value from 0.01 to 0.08 in five years and reach a value of 1.0 in 35 years. The willow habitat value would increase from 0.22 to 0.97 in 35 years. The sagebrush habitat value would increase from 0.2 to 0.89 in 10 years. The wetland habitat value would increase from 0.17 to 0.84 in 35 years. The aquatic habitat value would begin and remain at 0.01 for the entire 50 years (U.S. Army Corps of Engineers 2004). The Average Annualized Habitat Units (AAHUs) was calculated to be 45.81 (Appendix C).

### Medium Level Restoration Plan

The Medium Plan would increase the sinuosity and number of riffle-pool complexes and create habitat for benthic macroinvertebrates, an important food source for fish. Raising the streambed elevation would raise the groundwater table, which would help maintain seasonal wetlands and water supply for riparian habitat. The addition of wetlands would provide habitat for amphibians, birds, and other wildlife that use this habitat type during their life cycles. Water quality would improve as plants remove nutrients such as nitrates and phosphates from the water. Enhanced riparian forest, wetlands, and sagebrush/upland habitat would provide additional nesting, foraging, rearing, and resting habitat for wildlife. This would benefit wildlife by increasing population numbers and diversity. Habitat areas of moderate and low resource value would be converted into that of high value terrestrial vegetation types, resulting in a total of 122.23 acres of Resource Category 2 and 27.24 acres for Resource Category 3 (Table 6).

In the HEP analysis, this alternative would increase the cottonwood habitat value from 0.01 to 0.08 in five years and reach a value of 1.0 in 35 years. The willow habitat value would increase from 0.22 to 0.97 in 35 years. The sagebrush habitat value would increase from 0.2 to 0.89 in 10 years. The wetland habitat value would increase from 0.17 to 0.84 in 35 years. The aquatic habitat value would increase from 0.01 to 0.07 in 35 years (U.S. Army Corps of Engineers 2004). The Average Annualized Habitat Units (AAHUs) was calculated to be 51.42 (Appendix C).

### High Level Restoration Plan

The High Plan would also increase the number of riffle-pool complexes and would create habitat for benthic macroinvertebrates. Raising the streambed elevation would raise the groundwater table, which would help maintain seasonal wetlands and water supply for riparian habitat. Wetlands would be constructed that would provide habitat for amphibians, birds, and other wildlife that use this habitat type during their life cycles. Water quality would improve as plants remove nutrients such as nitrates and phosphates from the water. Enhanced riparian forest, wetlands, and sagebrush/upland habitat would provide additional nesting, foraging, rearing, and resting habitat for wildlife. Habitat areas of moderate and low resource value would be converted into that of high value terrestrial vegetation types, resulting in a total of 137.57 acres of Resource Category 2 and 20.89 acres for Resource Category 3 (Table 6).

The HEP analysis showed an increase in the cottonwood habitat value from 0.01 to 0.08 in five years and a value of 1.0 in 35 years. The willow habitat value would increase from 0.22 to 0.97 in 35 years. The wetland habitat value would increase from 0.17 to 0.84 in 35 years. The sagebrush cover habitat value would increase from 0.2 to 0.89 in 10 years. The aquatic habitat would increase from 0.01 to 0.49 in 50 years (U.S. Army Corps of Engineers 2004). The Average Annualized Habitat Units (AAHUs) was calculated to be 95.62 (Appendix C).

### Socio-economic Evaluation

TNC will retain ownership of the McCarran Ranch property in Washoe and Storey counties. One residential home is currently being used as an office by TNC. This organization will maintain and manage the historic home of Senator McCarran located on the property. Public access will be allowed

through a conservation easement. Fishing from the river banks will be allowed. Cattle grazing has been discontinued, but currently, wild or stray horses have access to the property (J. Garcia, U.S. Army Corps of Engineers, pers. comm., 2003). The area is and will continue to be designated as open space.

There are no existing recreational facilities on site. Recreational opportunities are limited due to the limited river access. However, potential recreational activities may include fishing, hiking, and nature study once the project is completed. There may be an increase in recreational use of the area, but it is unlikely to have a major socio-economic impact to Washoe or Storey Counties.

## ENHANCEMENT

Riparian and wetland areas around the Truckee River have been impacted by channelization, over-grazing, point-source pollutants, and the introduction of invasive weeds. Enhancement of these areas through in-stream restoration, revegetation, and control of invasive weeds improve the value of these areas to fish and wildlife. Vegetation along stream corridors may provide habitat for wildlife species, including mammals and migratory birds. Vegetation that shades the stream corridor may also lower stream temperatures for fish and aquatic invertebrates. Invasive weeds along many stream channels in the Truckee River have reduced plant diversity within habitats; this can lead to reduced numbers of wildlife using these areas. The following are our recommendations for enhancement of habitat associated with the Restoration Project:

1. The LCT Truckee River Recovery Implementation Team (TRIT) has finalized the Short-Term Action Plan (2003) for the species (available at <http://nevada.fws.gov/lctrit/FinalTRIT.pdf>). This Short-Term Plan identifies priority areas with current or potential opportunities to support LCT or important habitats that would sustain various life history stages. It also specifies tasks to be implemented to help ensure long-term persistence of the species. All aspects of the Restoration Project should be reviewed for consistency with this plan.
2. TNC should be encouraged to develop and implement a management plan for wild/stray horses and burros, consistent with the purposes of the Restoration Project.
3. A significant component of TNC's revegetation plan will involve control of tall whitetop. It is anticipated that treatment and containment will be a multi-year effort incorporating a variety of methods that include the use of chemicals harmful to fish and wildlife. The revegetation plan should be comprehensive and detail proactive measures to avoid impacts to other flora and fauna. A long-term monitoring plan with evaluation criteria should be included.
4. During in-stream construction, add large woody debris (e.g., logs) for providing shaded cover and a food source for BMI's in the short-term, until riparian forest structure and functions are properly restored. Supplement as needed through the life of the project.
5. If fine sediments are considered problematic in this reach of the Truckee River, consider selective loading of clean gravel/rubble materials during bank reconstruction, which can be

recruited into the coarse sediment bedload during high flow events. This should be evaluated periodically and if successful, implemented throughout the life of the project.

6. TNC should be encouraged to develop environmental educational displays (i.e., signage) in association with long-term management of the property. Components should include promotion of native species and methods that minimize the spread of exotics.
7. We understand that a debris dam exists which creates the head needed for the diversion on McCarran Ranch. This may present a passage problem for fish during certain times of the year. This should be re-engineered so that it allows for unobstructed fish passage.
8. In accordance with the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 et. seq.), any land clearing or other surface disturbance should be timed to avoid potential destruction of bird nests or young, or birds that breed in the area. If this is not feasible, a qualified biologist should survey the area prior to land clearing. If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

## RECOMMENDATIONS

The following recommendations are based on the current project information provided by the Corps. These recommendations are to assist the Corps during the project's planning process to ensure that adverse impacts to existing wildlife resources are avoided or minimized.

1. It is recommended that the option most beneficial to riparian, aquatic, and wetland habitats be selected. As evidenced by results from the Habitat Evaluation Procedure (Attachment C), the most beneficial option over the long term is the High Level Restoration Plan alternative; the second most beneficial option is the Medium Level Restoration Plan alternative.
2. Work activities should be scheduled to minimize adverse impacts to wildlife resources. Construction should occur after nesting and rearing of young birds have been completed. Because of the diversity of bird species and ranges of nesting periods possible, the Service is unable to provide precise dates when construction would not impact any species. To ensure impacts to nests or young do not occur, surveys could be conducted prior to construction to determine whether any birds are nesting in the area.
3. Three federally-listed and one candidate species may be found in the Restoration Project area. These include the threatened Lahontan cutthroat trout and bald eagle, the endangered cui-ui, and the candidate yellow-billed cuckoo. Under the Endangered Species Act, completed projects should not preclude future recovery and survival of listed species. All aspects of the project be reviewed for all direct and indirect impacts that it may have on habitat as they relate to listed species, and that you consult with the Service accordingly under section 7 of the



Endangered Species Act. Candidate species receive no legal protection under the Act, but could be proposed for listing in the near future. Consideration of these species during project planning may assist species conservation efforts and may prevent the need for future listing actions.

4. Several species of concern may also occur in the project area. Surveys should be conducted of the project area for these species. If these species or their habitats are encountered within the impact area, we recommend loss of those habitats be avoided to the greatest extent possible.
5. Excess spoil materials should be properly stored. Measures should be implemented to ensure that spoil materials does not enter the Truckee River channel or wetlands. As stated, construction activities will occur when flows are low in the channel. Construction activities should occur when the river channel wetlands are dry or at lowest surface water elevations.
6. As stated, a contractor will prepare a stormwater pollution prevention plan. This should be expanded to include a spill prevention and containment countermeasure plan that addresses all potential mechanisms of contamination. Suitable containment materials should be on-hand in the event of a spill.
7. Mitigation and enhancement areas should be monitored throughout the life of the project to ensure success. Contingency measures should be identified in case of failures.
8. Tall whitetop has encroached along the Truckee River and in adjacent uplands in the project area. Removal and control of this exotic species will provide wildlife enhancement features for the project. Our current understanding of chemical treatment indicate that the following precautionary measures should be in place to avoid damage to other resources:
  - a. All mixing and transfers of herbicides from one container to another be done over a plastic tarp in an upland location greater than 100 yards from riparian or wetland areas;
  - b. A spill kit containing shovels and absorbent pads be readily available to contain and soak up leakage or spills;
  - c. In the event of a spill, soil contaminated with product be immediately excavated and placed in leak proof containers;
  - d. Personnel applying herbicides be instructed on their environmental hazards, the importance of keeping the product out of and away from the river and wetlands, and be provided with notification and containment procedures if an accidental spill occurs;
  - e. Empty containers be disposed of according to label directions and plastic disposal bags be used to dispose of any waste materials in contact with herbicides;
  - f. To avoid consequences of overspray onto native plant species or onto water surfaces, spraying activities not be conducted on windy days or be ceased if windy conditions arise;
  - g. Application not be conducted if precipitation is forecast within 72 hours and application be suspended for at least 24 hours subsequent to a precipitation event; and

- h. A wick applicator and a water labeled formula of 2,4-D should be used for whitetop control in infested areas located within 30 feet of the Truckee River.

Additional measures to avoid impacts of tall whitetop chemical treatment to listed species due to this project should be addressed during the section 7 consultation process.

- 9. If hay/straw bales are used for sediment control, they will be certified weed-free to reduce establishment/reestablishment of invasive weeds.
- 10. Minimize in-stream time and the number of stream crossings for heavy equipment. Stream crossings should be perpendicular to the stream and in designated areas using gently-sloping and stable banks.
- 11. Temporary roads should be constructed to the minimal number, width, and total length consistent with construction activities. Minimize roads in sensitive areas (e.g., riparian). Water bars and other erosional controls should be installed for permanent roads or trails.
- 12. Minimize use of imported materials, which should be from a reputable source and of similar characteristics to that occurring naturally. Imported materials should be clean of possible invasive species (e.g., washed rock).
- 13. As a part of precautionary measures, clearly mark areas where contaminants are of concern (i.e., 2-3 underground heating oil tanks, former sand and gravel operation site, Santa Fe Pacific Petroleum Pipeline, and barrels of waste oil and tanker car full of solidified asphalt) if these are within the work area. Minimize heavy equipment use in these areas as part of construction work plan.
- 14. Develop long-term plans for the appropriate disposal of potential contaminants.
- 15. Fencing should be considered to protect sensitive areas from grazers (e.g., wild horses and deer). Fences should be constructed in a manner that does not interfere with the seasonal migrations of deer and other wildlife (except for wild horses). Consult with the Bureau of Land Management on appropriate fencing design and Nevada Department of Wildlife on migration concerns.
- 16. If possible, water used for construction and irrigation should be of a source other than surface water. If surface water is used, screen intakes to avoid fish entrainment. Water delivery systems should be updated, monitored, and maintained so as to maximize efficiency. Water savings should be left for in-stream flows.
- 17. Areas to be de-watered should implement a ramp-down rate of no greater than 3 inches per hour. De-watering should not occur during the spring and summer seasons to avoid migration period and minimize thermal stress on fish. Areas should be monitored during de-watering for fish stranding. Personnel and equipment should be on-hand to conduct fish rescues if needed, placing fish outside areas of construction. If pumping should become necessary, these should

be screened to avoid entrainment of fish. At least one month in advance, coordinate with NDOW and the Service on fish salvage operations.

18. The planned use of explosives for creating golden eagle and prairie falcon nesting cavities should be abandoned as the cliff faces on-site are not nearly high enough to be attractive to these nesting species.
19. Maximize efforts to salvage trees in the local area, transplanting to designated sites in accordance with the Restoration Plan.

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- U.S. Geological Survey. 1996. Daily Flow Routing for the Truckee River, California and Nevada.

## **APPENDICES**

Appendix A. List of wildlife species known to occur or may occur in and along the McCarran Ranch Restoration Project area.

Common Name	Scientific Name
<b>Birds</b>	
Spotted sandpiper	<i>Actitis macularia</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Wood duck	<i>Aix sponsa</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Mallard	<i>Anas platyrhynchos</i>
Great blue heron	<i>Ardea herodias</i>
Western burrowing owl	<i>Athene cunicularia hypugaea</i>
Canada goose	<i>Branta canadensis</i>
Great horned owl	<i>Bubo virginianus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
House finch	<i>Carpodacus mexicanus</i>
Turkey vulture	<i>Cathartus aura</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Killdeer	<i>Charadrius vociferus</i>
Common nighthawk	<i>Chordeiles minor</i>
Yellow-billed cuckoo <sup>a</sup>	<i>Coccyzus americanus</i>
Northern flicker	<i>Colaptes auratus</i>
Rock dove	<i>Columba livia</i>
Western wood-pewee	<i>Contopus sordidulus</i>
Common raven	<i>Corvus corax</i>
Yellow warbler	<i>Dendroica petechia</i>
Snowy egret	<i>Egretta thula</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
American kestrel	<i>Falco sparverius</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Bald eagle <sup>b</sup>	<i>Haliaeetus leucocephalus</i>
Barn swallow	<i>Hirundo rustica</i>
Yellow-breasted chat	<i>Icteria virens</i>
Northern oriole	<i>Icterus galbula</i>
California quail	<i>Lophortyx californicus</i>
Song sparrow	<i>Melospiza melodia</i>
Common merganser	<i>Mergus merganser</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Lazuli bunting	<i>Passerina amoena</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Black-head grosbeak	<i>Pheucticus melanocephalus</i>
Black-billed magpie	<i>Pica pica</i>
Downy woodpecker	<i>Picoides pubescens</i>
Spotted towhee	<i>Pipilo maculatus</i>
White-faced ibis	<i>Plegadis chihi</i>
Bank swallow	<i>Riparia riparia</i>
Say's phoebe	<i>Sayornis saya</i>
Chipping sparrow	<i>Spizella passerina</i>
No. rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Western meadowlark	<i>Sturnella neglecta</i>
European starling	<i>Sturnus vulgaris</i>
Bewick's wren	<i>Thryomanes bewickii</i>
House wren	<i>Troglodytes aedon</i>

Common Name	Scientific Name
American robin	<i>Turdus migratorius</i>
Western kingbird	<i>Tyrannus verticalis</i>
Warbling vireo	<i>Vireo gilvus</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Mourning dove	<i>Zenaida macroura</i>
<u>Mammals</u>	
White-tailed antelope ground squirrel	<i>Ammospermophilus leucurus</i>
Pallid bat	<i>Antrozous pallidus</i>
Coyote	<i>Canis latrans</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
Ord's kangaroo rat	<i>Dipodomys ordii</i>
Chisel-toothed kangaroo rat	<i>Dipodomys microps</i>
Big brown bat	<i>Eptesicus fuscus</i>
Spotted bat	<i>Euderma maculatum</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Western red bat	<i>Lasiurus blossevillii</i>
Hoary bat	<i>Lasiurus cinereus</i>
Sagebrush vole	<i>Lemmiscus curtatus</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>
Yellow-bellied marmot	<i>Marmota flaviventris</i>
Stripped skunk	<i>Mephitis mephitis</i>
Mountain vole	<i>Microtus mantanus</i>
Long-tailed vole	<i>Microtus longicaudus</i>
Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
California myotis	<i>Myotis californicus</i>
western small-footed myotis	<i>Myotis ciliolabrum</i>
Long-eared myotis	<i>Myotis evotis</i>
Little brown myotis	<i>Myotis lucifugus</i>
Fringed myotis	<i>Myotis thysanodes</i>
Long-legged myotis	<i>Myotis volans</i>
Yuma myotis	<i>Myotis yumanensis</i>
Mule deer	<i>Odocoileus hemionus</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern grasshopper mouse	<i>Onychomys leucogaster</i>
Great Basin pocket mouse	<i>Perognathus parvus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Western pipistrelle	<i>Pipistrellus hesperus</i>
Racoon	<i>Procyon lotor</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Broad-footed mole	<i>Scapanus latimanus</i>
Western gray squirrel	<i>Sciurus griseus</i>
Merriam's shrew	<i>Sorex merriami</i>
Belding's ground squirrel	<i>Spermophilus beldingi</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
Townsend's ground squirrel	<i>Spermophilus townsendii</i>
Western spotted skunk	<i>Spilogale gracilis</i>
Mountain cottontail	<i>Sylvilagus nuttalli</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Least chipmunk	<i>Tamias minimus</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
Northern pocket gopher	<i>Thomomys talpoides</i>

Common Name	Scientific Name
Red fox	<i>Vulpes vulpes</i>
<u>Reptiles</u>	
Northwestern pond turtle	<i>Clemmys marmorata marmorata</i>
Western whiptail lizard	<i>Cnemidophorus tigris</i>
Western skink	<i>Eumeces skiltonianus</i>
Longnose leopard lizard	<i>Gambelia wislizenii</i>
California kingsnake	<i>Lampropeltis getula californiae</i>
Striped whipsnake	<i>Masticophis taeniatus</i>
Great Basin gopher snake	<i>Pituophis catenifer</i>
Western fence lizard	<i>Sceloporus occidentalis</i>
Northern sagebrush lizard	<i>S. graciosus graciosus</i>
Ground snake	<i>Sonora semiannulata</i>
Western terrestrial garter snake	<i>Thamnophis elegans elegans</i>
Side blotched lizard	<i>Uta stansburiana</i>
<u>Amphibians</u>	
Western toad	<i>Bufo boreas</i>
Pacific treefrog	<i>Pseudacris (Hyla) regilla</i>
Bullfrog	<i>Rana catesbeiana</i>
Northern leopard frog	<i>Rana pipiens</i>
Great Basin spadefoot toad	<i>Spea intermontana</i>
<u>Fish</u>	
Tahoe sucker	<i>Catostomus tahoensis</i>
Cui-ui <sup>c</sup>	<i>Chasmistes cujus</i>
Paiute sculpin	<i>Cottus beldingi</i>
Carp	<i>Cyprinus carpio</i>
Western mosquitofish	<i>Gambusia affinis</i>
Tui chub	<i>Gila bicolor</i>
Brown bullhead	<i>Ictalurus nebulosis</i>
Channel catfish	<i>Ictalurus punctatus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Lahontan cutthroat trout <sup>b</sup>	<i>Oncorhynchus clarki henshawi</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Yellow perch	<i>Perca flavescens</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Mountain whitefish	<i>Prosopium williamsoni</i>
Speckled shiner	<i>Rhinichthys osculus</i>
Lahontan redbreast shiner	<i>Richardsonius egregius</i>
Brown trout	<i>Salmo trutta</i>
Brook trout	<i>Salvelinus fontinalis</i>

Sources: Otis Bay Environmental Consultants 2003; U.S. Department of the Interior 1998; U.S. Fish and Wildlife Service 2004.

<sup>a</sup> Federally-listed candidate species.

<sup>b</sup> Federally-listed threatened species.

<sup>c</sup> Federally-listed endangered species.



Appendix B. Avoidance measures identified by the Corps to be implemented during construction of the McCarran Ranch Restoration Project.

<b>Description</b>	<b>Purpose: Minimize or prevent...</b>
Use of local materials similar to that occurring naturally (e.g., cobble, soil)	risk caused by invasive species from off-site sources
Use of plugs for newly created meanders to minimize erosion <sup>a</sup>	bank erosion from river flow
Bioengineering techniques implemented (e.g. wattles, willow bundles, coir mattresses) <sup>a</sup>	bank erosion from surface water
Realignment to avoid existing wetlands, oxbows, & cottonwood stands <sup>a</sup>	damage to valued habitats
Access roads & staging areas would be temporary & habitat would be restored.	damage to valued habitats
Access roads & staging areas located in already disturbed areas	damage to valued habitats
Removal of plugs in a manner to minimize erosion <sup>a</sup>	sediment movements to downstream areas
Silt fence or other sediment control devices used	sediment movements to downstream areas
Excavated areas (e.g., wetlands) to leave existing riparian vegetation	habitat disturbance
Replacement of large boulders removed from river during construction <sup>a</sup>	habitat disturbance
In-stream construction during low flow (summer-fall); avoid LCT and Cui-ui spring migrations (Feb to July) <sup>a</sup>	erosion & sediment mobilizing to downstream areas; disturbance during spring fish migration and eagle nesting seasons
Sloping of riverbanks	bank erosion
Precautions taken to prevent accidental fuel spills or other contamination; includes use of silt fences or temporary berms around excavation areas	contamination
Stormwater pollution prevention plan	contamination
Motor oils and fuels would be stored in a manner to prevent surface water or groundwater contamination. Discarded materials/accidental spills would be properly disposed.	contamination
Equipment to be refueled at least 90 ft away from waterway, and stored in staging area at least 200 ft away from waterway. Staging area will be on level ground with a berm	contamination
Equipment will be monitored and maintained for fuel leaks	contamination
Bare ground would be watered	wind and water erosion
Banks planted at the end of construction season	adverse effects on seed germination
Reseed areas with native grasses	soil erosion from surface water runoff
Proper maintenance of equipment	harmful air emissions
Idle engines no more than 10 minutes	harmful air emissions
Encourage carpooling	harmful air emissions
Schedule movement of construction materials during off-peak hours	harmful air emissions
Use of water trucks	airborne dust
Limit speed to 10 mph on unpaved surfaces	harmful air emissions
No excavation when wind speeds are greater than 20 mph	airborne dust
Maintain at least 2 ft of freeboard on haul trucks; cover loads during windy days or when traveling at high speeds	airborne dust

Description	Purpose: Minimize or prevent...
Equipment would enter/leave construction site via designated routes	airborne dust
Excavated soil stockpiles would use BMPs	wind erosion

<sup>a</sup> for High and Medium Plan.

Appendix C. Results of a Habitat Evaluation Procedure Analysis (HEP) showing cumulative habitat units (HUs) and average annualized habitat units (AAHUs) for each action alternative.

Low Plan:

Cover-Type	TY1	TY3	TY5	TY10	TY20	TY35	TY50	
PFO/SSA & PFOA (Cottonwood)	0.56	2.33	2.33	10.84	21.68	70.92	70.92	
PSS/EMC & PSS/EMF, PSSA, R2USC (Willow)	3.82	4.61	4.61	17.68	35.36	89.63	89.63	
PEMB, PEMC (Wetland)	5.70	22.59	22.59	55.39	110.79	11.76	176.36	
BSS/WSS (Sagebrush/Upland)	8.62	13.11	13.11	96.30	192.61	543.90	543.90	
Aquatic Habitat	0.79	1.97	1.97	4.92	9.84	14.77	14.77	AAHUs
	19.50	44.62	44.62	185.14	370.27	730.97	895.57	45.81

Medium Plan:

Cover-Type	TY1	TY3	TY5	TY10	TY20	TY35	TY50	
PFO/SSA & PFOA (Cottonwood)	0.78	3.23	3.23	15.02	30.03	98.24	98.24	
PSS/EMC & PSS/EMF, PSSA, R2USC (Willow)	5.78	6.97	6.97	26.72	53.44	135.46	135.46	
PEMB, PEMC (Wetland)	6.86	27.17	27.17	66.63	133.26	14.14	212.12	
BSS/WSS (Sagebrush/Upland)	7.17	10.91	10.91	80.10	160.20	452.39	452.39	
Aquatic Habitat	2.25	11.74	11.74	29.34	58.69	88.03	88.03	AAHUs
	22.84	60.02	60.02	217.81	435.62	788.27	986.25	51.42

High Plan:

Cover-Type	TY1	TY3	TY5	TY10	TY20	TY35	TY50	
PFO/SSA & PFOA (Cottonwood)	0.81	3.33	3.33	15.46	30.92	101.13	101.13	
PSS/EMC & PSS/EMF, PSSA, R2USC (Willow)	9.37	11.30	11.30	43.34	86.67	219.69	219.69	
PEMB, PEMC (Wetland)	8.08	32.01	32.01	78.49	156.98	16.66	249.89	
BSS/WSS (Sagebrush/Upland)	5.50	8.36	8.36	61.43	122.86	346.93	346.93	
Aquatic Habitat	15.51	99.33	99.33	248.32	496.64	744.96	744.96	AAHUs
	39.27	154.33	154.33	447.03	894.06	1429.38	1662.61	95.62